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Technical Bulletin:
Calfax®

High Performance Surfactants For Cleaning Applications

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Introduction

Calfax[®]-surfactants are disulfonated surfactants with structural features that give them unique and useful properties. Although each Calfax[®]-surfactant is a mixture of several different components, the main component is the monalkyl disulfonate set of isomers in shown Figure 1. In these molecules, each ring has a sulfonate group and one of the two rings has an alkyl group. The alkyl group and counterion on the sulfonate vary depending on the product, also shown in Figure 1.

Calfax [®] - Product	R	X
10L-45	linear C10	Na
10LA-75	linear C10	H
12L-45	linear C12	Na
DB-45	branched C12	Na
DBA-70	branched C12	H
16L-35	linear C16	Na

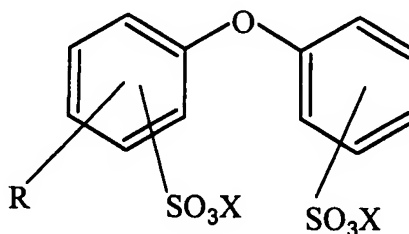


Figure 1. Structure of the major component of the Calfax[®]- products.

Calfax[®]- Properties

The composition of each Calfax[®]-product has been optimized to obtain all of its desirable properties. Those properties are very low critical micelle concentrations (CMC), high efficiency, very high water solubility, superior water hardness tolerance, exceptional electrolyte tolerance, and excellent compatibility with chlorine bleach, hydrogen peroxide, acids, and bases. We will cover each of these areas.

Calfaxes[®]-have Low CMCs

Since the presence of micelles greatly enhances the performance of a surfactant in many applications, a lower critical micelle concentration (CMC) often allows the surfactant to be used effectively at a lower concentration. Additionally, in many cases the factors that reduce CMC, such as hydrophobic and hydrophilic interactions, also improve the performance of the surfactant in a given application. Consequently, surfactants with lower CMC values may have better performance at any concentration than surfactants with higher CMC values.

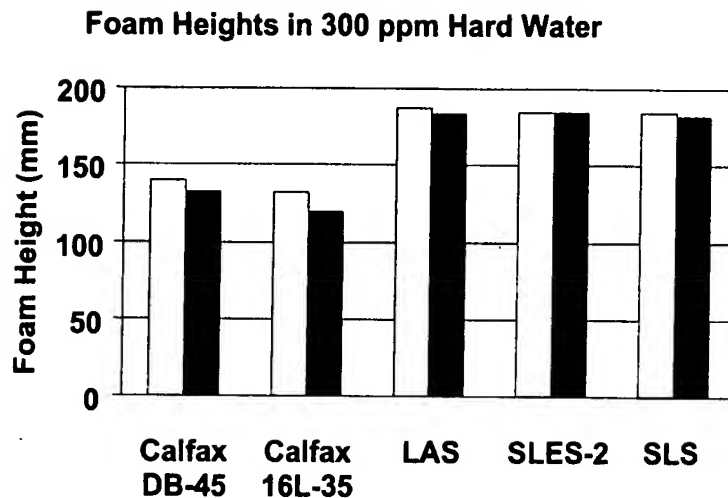
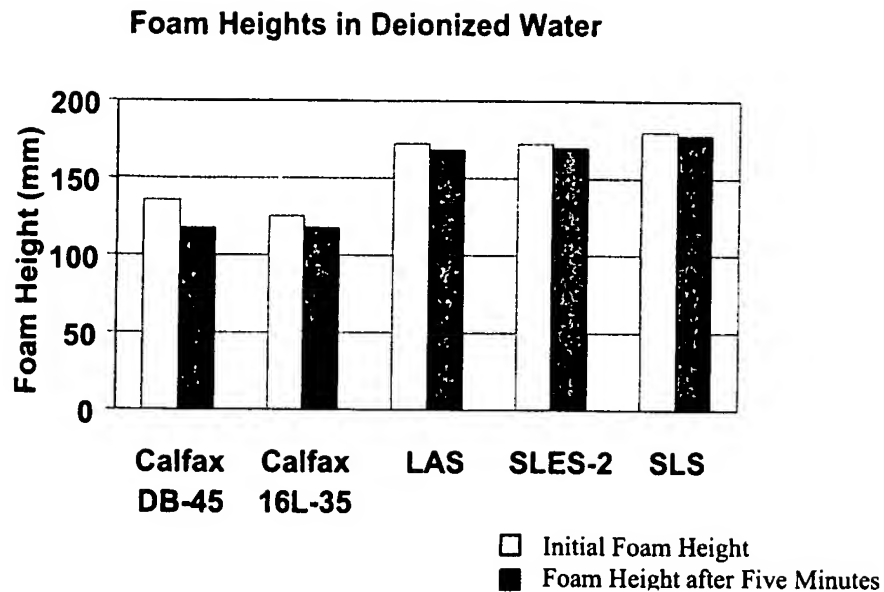


Figure 4. Ross-Miles foam test results for Calfax[®] and typical anionic surfactants.

Calfaxes[®] are Moderate Foamers

As seen in the results of the Ross-Miles foam tests shown in Figure 4, Calfax[®] products also foam less than typical anionic surfactants. This makes them potentially useful in applications such as detergents for high efficiency (horizontal axis) laundry.

Hydrogen Peroxide

Calfax[®]-surfactants are also the preferred surfactants for working with hydrogen peroxide. Shown in Figure 7 are the results of a peroxide stability test for a 5% peroxide solution in the presence of 0.5% surfactant at 60 °C. Tests were run at 60 °C to accelerate the decomposition process. As seen in the figure, all of the surfactants stabilize peroxide to some extent. However, peroxide is clearly the most stable in the presence of Calfax[®]-compared to all of the other surfactants shown.

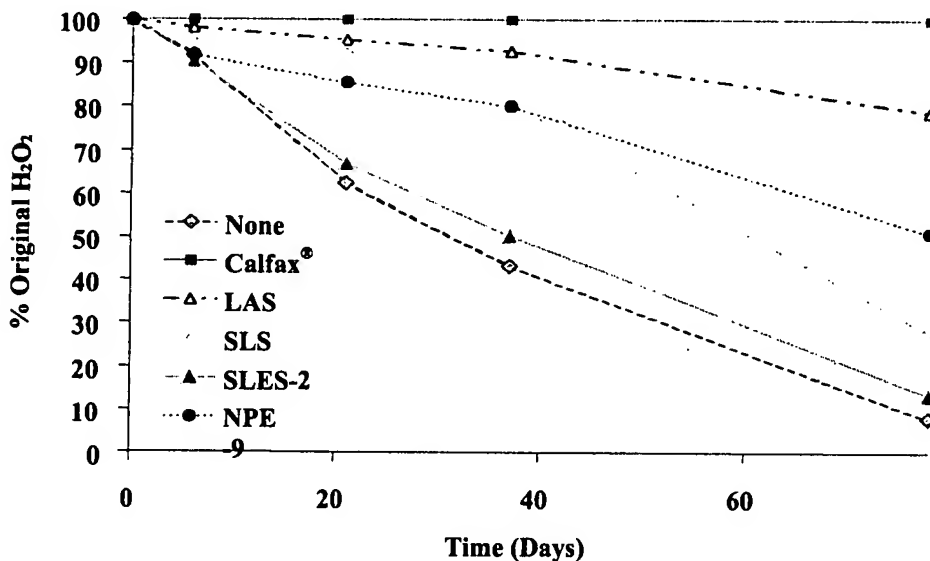


Figure 7. Decomposition of hydrogen peroxide at 60°C as a function of time in the presence of Calfax[®] and several other surfactants.